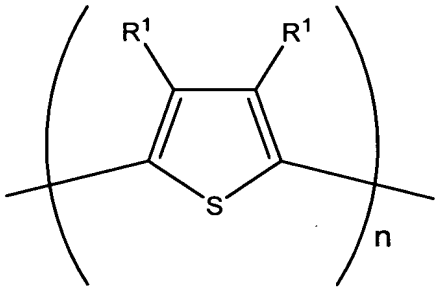
CLAIMS

What is claimed is:

1. A composition comprising at least one conductive polymer and at least one non-polymeric fluorinated organic acid, wherein the conductive polymer is selected from a polythiophene, a polypyrrole, a polyaniline, and combinations thereof.

2. A composition according to claim 1, wherein the composition is an aqueous dispersion having a pH 1 and 8.

3. A composition according to Claim 1, wherein the polythiophene comprises Formula I:



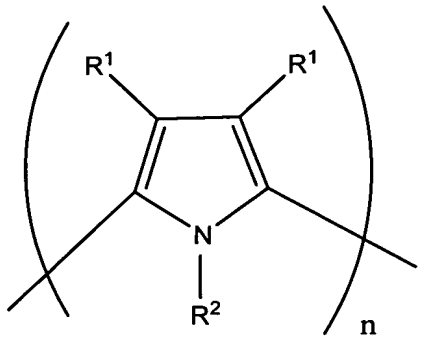
(I)

wherein:

R^1 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, alkoxy, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, benzyl, carboxylate, ether, ether carboxylate, amidosulfonate, ether sulfonate, and urethane; or both R^1 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms, and

n is at least about 4.

4. A composition according to Claim 1, wherein the polypyrrole comprises Formula II:



(II)

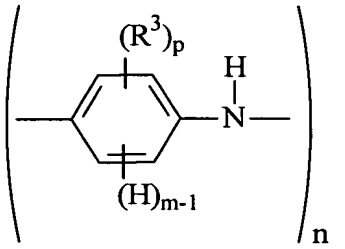
wherein:

n is at least about 4;

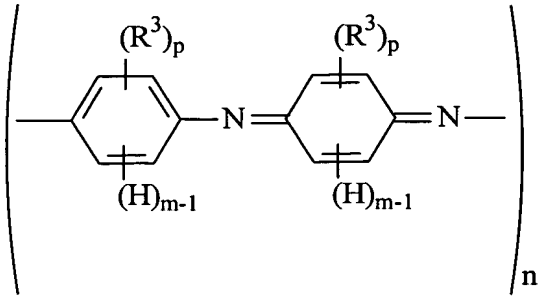
R^1 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, alkoxy, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, benzyl, carboxylate, ether, ether carboxylate, amidosulfonate, ether sulfonate, and urethane; or both R^1 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms; and

R^2 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, aryl, alkanoyl, alkylthioalkyl, alkylaryl, arylalkyl, amino, epoxy, silane, siloxane, alcohol, benzyl, carboxylate, ether, ether carboxylate, amidosulfonate, ether sulfonate, and urethane.

5. A composition according to Claim 1, wherein the polyaniline comprises Formula III or Formula IV:



(III)



(IV)

wherein:

n is at least about 4;

p is an integer from 0 to 4;

m is an integer from 1 to 5, with the proviso that p + m = 5; and

R^3 is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, carboxylic acid, halogen, cyano, or alkyl substituted with one or more of sulfonic acid, carboxylic acid, halo, nitro, cyano or epoxy moieties; or any two R^3 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms.

6. A composition according to Claim 1, wherein the non-polymeric fluorinated organic acid is selected from non-polymeric fluorinated sulfonic acids, non-polymeric fluorinated phosphoric acids, non-polymeric

fluorinated phosphonic acids, non-polymeric fluorinated carboxylic acids, non-polymeric fluorinated acrylic acids, and mixtures thereof.

7. A composition according to Claim 1, wherein said non-polymeric fluorinated organic acid is selected from fluoroamido organic acids, fluoroamidoether organic acids, fluoroether organic acids, and combinations thereof.

8. A composition according to Claim 7, wherein said non-polymeric fluorinated organic acid is highly fluorinated.

9. A composition according to Claim 7, wherein said non-polymeric organic acid is perfluorinated.

10. A composition according to Claim 7, wherein said non-polymeric fluorinated organic acid is a fluoroether sulfonic acid having Formula V:

$$R^7\text{-}(O\text{-}CF_2CFR_f)_a\text{-}O\text{-}CF_2CFR'_fSO_3H \qquad (V)$$

wherein R^7 is a fluoroalkyl group, Rf and R'f are independently selected from F, Cl or a perfluorinated alkyl group having 1 to 10 carbon atoms, and a = 0, 1 or 2.

11. A composition according to Claim 10, wherein said fluoroethersulfonic acid is selected from 2-(1,1,2,3,3,3-hexafluoro-1-(perfluoroethoxy)propane-2-yloxy)-1,1,2,2-tetrafluoroethanesulfonic acid, 1,1,2,2-tetrafluoro-2-(perfluoroethoxy)ethanesulfonic acid, and 2-(1,1,2,2-tetrafluoroethoxy)-1,1,2,2-tetrafluoroethanesulfonic acid.

12. A composition according to Claim 2, further comprising an additional material selected from polymers, dyes, carbon nanotubes, metal nanowires, metal nanoparticles, carbon nanoparticles, carbon fibers, carbon particles, graphite fibers, graphite particles, coating aids, organic conductive inks, organic conductive pastes, inorganic conductive inks, inorganic conductive pastes, charge transport materials, semiconductive inorganic oxide nano-particles, insulating inorganic oxide nano-particles, piezoelectric nano-particles, pyroelectric nano-particles, ferroelectric oxide nano-particles, piezoelectric polymers, pyroelectric polymers, ferroelectric oxide polymers, photoconductive oxide nanoparticles, photoconductive polymers, dispersing agents, crosslinking agents, and combinations thereof.

13. A composition according to Claim 2, further comprising at least one co-dispersing liquid.

14. A composition according to Claim 13, wherein the co-dispersing liquid is selected from ethers, cyclic ethers, alcohols, alcohol ethers, ketones, nitriles, sulfides, sulfoxides, amides, amines, carboxylic acids, and combinations thereof.

15. An electronic device comprising at least one layer comprising a composition according to Claim 1.

16. The device of claim 15 wherein at least one layer comprising the composition of Claim is a buffer layer.

17. A device according to Claim 16, wherein the device is selected a photosensor, photoswitch, light-emitting diode, light-emitting diode display, photodetector, phototransistor, photoconductor, phototube, Infra-Red detector, diode laser, electrochromic device, electromagnetic shielding device, solid electrolyte capacitors, energy storage device, field effect resistance device, memory storage device, biosensor, photoconductive cell, photovoltaic device, solar cell, memory storage, antistatic film, electrochromic, solid electrolyte capacitors, energy storage, electromagnetic shield and diode.

18. A thin film field effect transistor comprising at least one electrode comprising the composition of Claim 1.